

WHAT IS CLAIMED IS:

1. A fuel cell for generating an electric power by supplying one electrode with a fuel and the other electrode with an oxidant, the fuel cell  
5 comprising:  
a catalyst layer formed on at least one surface of at least one of the one electrode and the other electrode;  
wherein the catalyst layer is a layer comprising catalyst particles alone, a layer comprising a mixture of the catalyst particles and other  
10 particles, or a layer of a porous film carrying at least the catalyst particles, and  
a molecule comprising an ion-conducting functional group serving as an electrolyte is chemically bonded to a surface of at least one selected from the group consisting of the catalyst particles, the other particles and  
15 the porous film.
2. The fuel cell according to claim 1, wherein the molecule comprising the ion-conducting functional group has a mean molecular weight of 40 to 10,000.  
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3. The fuel cell according to claim 1, wherein the molecule comprising the ion-conducting functional group comprises at least one selected from the group consisting of fluorocarbon and hydrocarbon.
- 25 4. The fuel cell according to claim 1, wherein the ion-conducting functional group is a proton dissociating functional group.
5. The fuel cell according to claim 4, wherein the proton dissociating functional group is at least one functional group selected from the group  
30 consisting of a phosphonyl group, a phosphinyl group, a sulfonyl group, a sulfinic group, a sulfonic group and a carboxyl group.
6. The fuel cell according to claim 1, wherein the ion-conducting functional group is a hydrogen bondable functional group.  
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7. The fuel cell according to claim 6, wherein the hydrogen bondable functional group is at least one functional group selected from the group

consisting of a mercapto group, an ether linkage group, a nitro group, a hydroxyl group, a quaternary ammonium base and an amino group.

8. The fuel cell according to claim 1, wherein the chemical bond is at least one bond selected from the group consisting of a covalent bond, an ionic bond, a coordinate bond and a metallic bond.

9. The fuel cell according to claim 1, wherein the chemical bond is a covalent bond formed by an elimination reaction.

10. The fuel cell according to claim 1, wherein the chemical bond is a bond via an oxygen atom.

11. The fuel cell according to claim 1, wherein the catalyst particles comprise at least one selected from the group consisting of platinum, gold, palladium, nickel, rhodium, cobalt, iridium, osmium and iron.

12. The fuel cell according to claim 1, wherein the catalyst layer further comprises an electron conductor.

13. The fuel cell according to claim 12, wherein the electron conductor is carbon.

14. The fuel cell according to claim 1, wherein the catalyst layer is the mixture of the catalyst particles and the other particles, and the other particles are an inorganic substance.

15. The fuel cell according to claim 14, wherein the inorganic substance comprises at least one selected from the group consisting of silica, alumina, quartz, glass, ceramics and mica.

16. The fuel cell according to claim 16, wherein the inorganic substance particles have a mean particle diameter ranging from 0.1 to 100  $\mu\text{m}$ .

17. The fuel cell according to claim 1, wherein the porous film has a porosity ranging from 5% to 95%.

18. The fuel cell according to claim 1, wherein the porous film has a mean pore diameter ranging from 0.1 nm to 10  $\mu\text{m}$ .
19. The fuel cell according to claim 1, wherein the catalyst layer has a thickness ranging from 0.1 to 10000  $\mu\text{m}$ .
- 5